The Science of Grass

Grass Botany

Most people know and refer to grasses by their common names: bamboos, sedges, rushes, oats, fescues, and so many more. But scientists must use plants' botanical names to ensure greater specificity when referring to specific plants. This system of knowledge is known as classification. All grasses are classified in the botanical family Poaceae, which is one of the largest flowering plant families on Earth.

Poaceae includes approximately 500 genera and, within those, roughly 8,000 species of plants. Botanists continue to identify new grasses and learn more about how grass plants are structured, and the list of Poaceae genera and species is frequently revised. To see the grass species of the world are identified and tracked by botanists, visit the Catalogue of New World Grasses. Here is some basic information on grass growth, which includes important information used to tell one species of grass from another.

Illustration of *Phylleum pretense*. Source: WikiCommons 4-17-13.

Grass Anatomy

Poaceae belongs to the plant classification Monocotyledon, due to characteristics related to grass seeds, leaves, roots and growth habits. This means that although there are thousands of grass species, all grasses have basic anatomical features in common:

- Narrow leaves
- Parallel veins
- Inconspicuous flowers
- Nodes (bulges) where leaves join stems

Also, most grass stems are hollow, except at the nodes.
Here is an interactive view of typical grass structures.

To identify a specific type of grass, it's helpful to use a dichotomous key. Keys are developed by botanists to walk observers through a plant's anatomical features, making distinctions that eventually lead to species identification.

Identification tools specific to turfgrasses:

[Turfgrass Species Tour](#)
[Turfgrass ID tool](#)

Grass Pests, Diseases and Weeds

Grasses are plants, and like all living things are susceptible to disease and suffer from pests. But plants that humans take an interest in can also be said to suffer from a third problem – weeds.

When we cultivate plants for food, as forage for our animals, or for use in gardens and landscaped green spaces, all three of these natural biological processes are threats. As a result, the pests, diseases and weeds of grasses have long been a subject of great scientific interest.

The resources below give an overview of the most common grass pests, diseases and weeds.

Pests
 From the UC Guide to Healthy Lawns:
- [Insects and other invertebrates](#)
- [Plant-parasitic nematodes](#)
- [Gophers, squirrels and other vertebrates](#)

Diseases
 [MSU Turf Diseases ID tool](#)
[The UC Guide to Healthy Lawns: diseases](#)

Weeds
[MSU Turf Weeds](#)
[The UC Guide to Healthy Lawns: identification key to weeds](#)

"Cool" versus "Warm" Grasses

Grasses, like all other forms of life, are sensitive to the temperature around them. They thrive in some temperature ranges, and go dormant in others.   All grasses fall into one of two groups — warm-season grasses or cool-season grasses.

Cool-season grasses are active primarily in the spring and fall, when average daytime

temperatures are cool (between 65°F and 75°F) and there is a good amount of precipitation. They go dormant in the hot, dry conditions of summer and freezing cold of winter.

Some well-know cool season grasses are:

Poa pratensis, commonly known as Kentucky Bluegrass

Festuca arundinacea, commonly known as Tall fescue

Lolium perenne, commonly known as Perennial ryegrass

Warm-season grasses become active in mid-spring, thrive in the hot, dry weather of mid-summer, and go dormant in the winter. Some well-known species of warm-season grasses are:

Stenotaphrum secundatum, commonly known as St. Augustinegrass

Cynodon dactylon, commonly known as Bermudagrass

Paspalum notatum, commonly known as Bahiagrass

Zoysia, a genus of grasses native to Asia

Buchloe dactyloides, commonly known as Buffalo grass

These grasses can be used for lawns, but <u>caution is warranted</u> because they are also considered invasive weeds in some regions.

There are also cool- and warm-season <u>ornamental grasses</u>

Decisions, decisions...

When establishing lawns and gardens, the choice between a cool-season grass or a warm-season grass can have a direct effect on irrigation, fertilization requirements, and other environmental considerations. Here is a USDA resource which explains how:

http://teamhabitat.sjrcd.org/WSGMaryland.pdf

Grasses: Scientific Research

People cultivate plants for food, as forage for our animals, and for use in gardens and landscaped green spaces. In addition to understanding the classification and anatomy of grasses, botanical scientists have long been interested in understanding how grasses function in the environment, identifying and studying the problems that grasses are susceptible to, and developing grasses that are hardier, more disease and pest resistant, drought-tolerant, and useful.

The Cutting Edge

Scientific research on grasses takes place at institutions world-wide. Here are announcements of findings from recent research:
Grasses for food and fuel

USDA Grass Research — History

The U. S. Department of Agriculture has supported research into grasses from its founding in 1862.

USDA Grass Research — Today
Some of the most significant recent and ongoing grass research projects at the USDA:
US National Arboretum - Dr. Scott Warnke
Pasture, Turf and Biofuel Grass Breeding Program

For more about ongoing USDA-sponsored grass research projects, go to Research, Education, and Economics Information System (REEIS)

Turf Research in US Colleges and Universities

Check this list for your state's turf information.

Other Organizations Supporting Turfgrass Research

There are many groups interested in promoting research into grasses for human uses. Here are some groups actively supporting research on turfgrass:

National Turfgrass Evaluation Program
National Turfgrass Federation
U. S. Golf Association – Green Research
National Turfgrass Initiative